LABORATORY FOR

ATMOSPHERES

Section 3

3. Organization, Staffing, and Facilities

The current Laboratory staff is comprised of 104 civil servants: 75 of these are scientists with 69 holding doctoral degrees and 11 are engineers. In addition, there are 54 visiting scientists (NRC, JCESS, JCET, USRA) and 222 non-civil service specialists supporting the various projects and research programs throughout the Laboratory.

Branches

The present Laboratory organization (see Chart 1) consists of the following units:

Tropical Rainfall Measuring Mission Office (TRMM), Code 910.1
The Office provides the infrastructure for planning and implementing a Global Validation Program (GVP) to support the TRMM and to support the TRMM Science Team. The Office also conducts relevant scientific studies including rain measurement technology research, precipitation processes studies, radar algorithm development, and the development of methodologies for validating satellite measurements of rainfall. Information on the Office activities can be found on the World-Wide Web (http://trmm.gsfc.nasa.gov/).

Data Assimilation Office (DAO), Code 910.3
Data assimilation combines all available meteorologically relevant observations with a prognostic model to produce accurate time series estimates of the complete global atmosphere. This Office advances the state of the art of data assimilation and the use of data in a wide variety of Earth system problems, develops global data sets that are physically and dynamically consistent, provides operational support for NASA field missions and Space Shuttle science, and provides model-assimilated data sets for the MTPE enterprise. Information on the Office activities can be found on the World-Wide Web (http://dao.gsfc.nasa.gov/).

Mesoscale Atmospheric Processes Branch, Code 912
This Branch studies the physics and dynamics of atmospheric processes through the use of satellite, aircraft, and surface-based remote sensing observations and computer-based simulations. It develops advanced remote sensing instrumentation (primarily lidar) and techniques to measure meteorological parameters in the troposphere. Key areas of investigation are cloud and precipitation systems and their environments from the scale of individual cloud systems to the scale of regional and global climates. Information on the Branch activities can be found on the World-Wide Web (http://rsd.gsfc.nasa.gov/912/).

Climate and Radiation Branch, Code 913
This Branch conducts basic and applied research with the goal of improving the fundamental understanding of regional and global climate on a wide range of spatial and temporal scales. Research emphasis is placed on radiative and dynamical processes leading to the formation of clouds and precipitation and their effects on the water and energy cycles of the Earth. Currently the major research thrusts of the Branch are: climate diagnostics, remote sensing applications, hydrologic processes and radiation, aerosol/climate interactions, and modeling seasonal-to-interannual variability of climate. Information on the Branch activities can be found on the World-Wide Web (http://climate.gsfc.nasa.gov/).

Atmospheric Experiment Branch, Code 915
This Branch carries out experimental investigations to further knowledge and understanding of the formation and evolution of various solar system objects such as planets, their satellites, and comets. Investigations of the composition and structure of planetary atmospheres as well as the physical phenomena occurring in the Earth's upper atmosphere are carried out. Neutral, ion, and gas chromatograph mass spectrometers are developed to measure atmospheric gases from entry probes and orbiting satellites. Information on the Branch activities can be found on the World-Wide Web (http://webhost.gsfc.nasa.gov/Code915/).

Atmospheric Chemistry and Dynamics Branch, Code 916

This Branch develops remote-sensing techniques to measure ozone and other atmospheric trace constituents important for atmospheric chemistry and climate studies, develops models for use in the analysis of observations, incorporates results of analysis to improve the predictive capabilities of models, and provides predictions of the impact of trace gas emissions on the ozone layer. Information on the Branch activities can be found on the World-Wide Web (http://hyperion.gsfc.nasa.gov/).

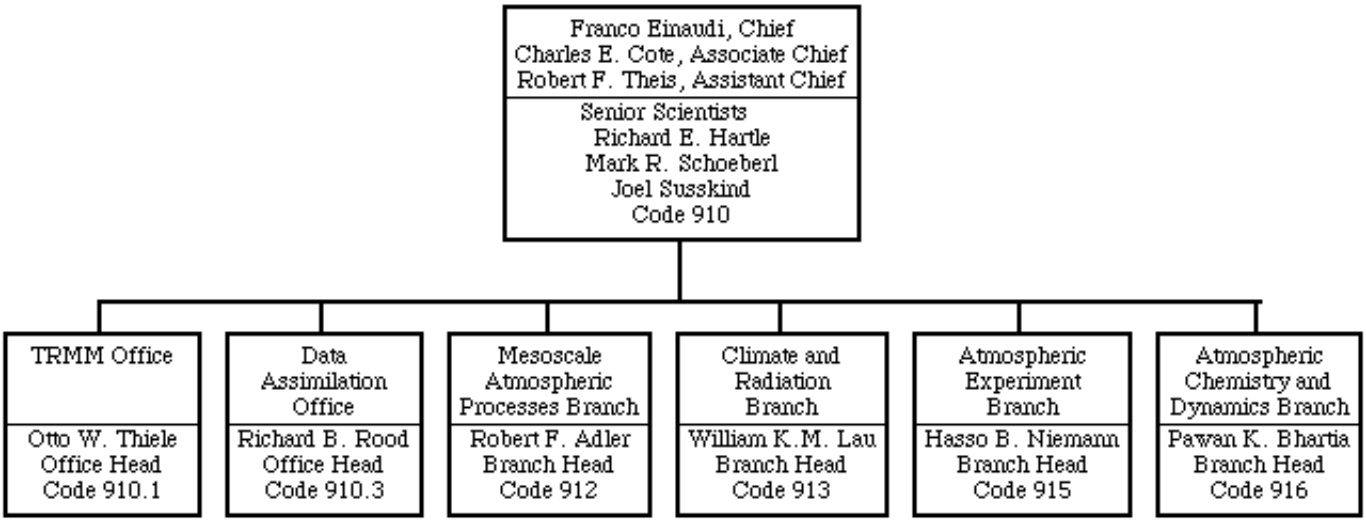

Chart 1. Organization of the Laboratory for Atmospheres

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Facilities

Major Laboratory facilities include:

- Computational Capabilities

The Laboratory computing equipment ranges from high performance supercomputers through scientific workstations to desktop PC and Mac systems. Supercomputers are operated for general use by the NASA Center for Computational Sciences (NCCS). Their flagship machine is a Cray T3D with 512 PE's (DEC 21064 Alpha microprocessor) each with 64 Mbytes of memory. Supercomputer resources are also available through special arrangement from the Ames Research Center at their Numerical Aerospace Simulation (NAS) facility.

Each Branch maintains a distributed system of workstations and desktop personal computers. The following is a sampling of the most capable workstation class machines currently in use within the Laboratory. These machines have been acquired to support particular programs, but may be available on a limited basis for other research.

Code	Machine	Processor	Memory
910.3	DEC Alpha 2100 DEC Alpha 8200 SGI Power Challenge	2 250 MHz 4 300 MHz 8 R10000 194 MHz	2000 MB 500 MB 1000 MB
912	SGI Onyx	2 R10000 194 MHz	1000 MB
916	SGI Power Challenge L	4 R10000 194 MHz	256 MB

- Mass Spectrometry

The Mass Spectrometry Laboratory is equipped with unique facilities for the design, development, fabrication, assembly, calibration and testing of flight mass spectrometers that are used in atmospheric sampling. The equipment includes precision tools and machining, material processing equipment, and calibration systems which are capable of simulating planetary atmospheres. Instruments which have utilized the facility include those for Venus, Saturn and Mars orbiting spacecraft, as well as Jupiter and Titan probes. The Laboratory also has flight instrument assembly and clean rooms, and hazardous gas handling equipment for poisonous and explosive gases.

- Optical Spectroscopy

The Spectroscopy Laboratory is set up to provide data on molecules of atmospheric interest, leading to the design of new scientific instrumentation or to better calibration of existing instruments, primarily in the near ultraviolet (UV). The Laboratory is well-equipped for quantitative spectroscopy and provides moderate spectral (0.03 nm) and temporal (~1 nsec) resolution. The Laboratory also provides a test bed for laser development and various detector technologies. The Laboratory is equipped with tunable and fixed wavelength laser sources, several spectrometers, a gas handling system, and a variety of test equipment.

- Lidar

The Laboratory has well equipped facilities to develop lidar systems for airborne and ground-based measurements of aerosols, methane, ozone, water vapor, pressure, temperature, and winds. Lasers capable of generating radiation from 200 nm to beyond 10 microns are available as are a range of sensitive photon detectors for use throughout this wavelength region. Telescopes with primaries up to 30 inches in diameter, high speed counting systems for detecting weak signals, and associated hardware are utilized. Lidars developed in the Laboratory include the Airborne Raman Lidar (methane, water vapor and temperature), STROZ LITE (ozone, temperature and aerosols), Large Aperture Scanning Airborne Lidar (clouds and aerosols), Cloud and Aerosol Lidar System (clouds and aerosols), Scanning Raman Lidar (water vapor), and the Edge Technique Wind Lidar System (wind).

- Radiometric Calibration and Development Facility (RCDF)

The RCDF supports the development and calibration of Shuttle demonstration flights for new techniques for ozone measurements operating in the UV, Visible (VIS), and Infrared (IR). As part of the Earth Observing System (EOS) calibration program, the RCDF will provide calibrations for future Solar Backscatter Ultraviolet/version 2 (SBUV/2) and Total Ozone Mapping Spectrometer (TOMS) instruments. The flight Shuttle Solar Backscatter Ultraviolet (SSBUV) instrument, successfully flown on eight shuttle missions, is being reconfigured for ground based measurements so that it can be used as a reference standard for network deployed UV monitors. The RCDF contains state of the art calibration equipment and standards traceable to the National Institutes for Standards and Technology. Calibration capabilities include wavelength, linearity, signal to noise (s/n), Instantaneous Field of View (IFOV), field of regard (FOR), and goniometry. Capabilities also exist to characterize instrument subsystems such as spectral dispersers and detectors. The Facility includes a class 10,000 clean room with a continuous source of N_2 for added contamination control.

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